AT the University of Manchester the following appointments have been made: A. G. Ogilvie, reader in geography; J. MacMurray, lecturer in philosophy; A. Gardner and R. L. Newall, demonstrators in anatomy.

DISCUSSION AND CORRESPONDENCE

A PROPOSAL OF TWO NEW MIOCENE FORMATIONAL NAMES

IN the summer of 1916, I organized, with the help and encouragement of Professor G. D. Harris, a paleontological expedition to Santo Domingo, with the hope of differentiating the Yaqui Valley Tertiary beds. These had been indiscriminately called Miocene by Professor Gabb in 1874, and in recent years referred by Dr. Dall and Dr. Pilsbry to the Oligocene. The members of the exploratory party were Mr. Karl Paterson Schmidt, Mr. Axel Olsson and the writer, the actual collecting being very efficiently done by the two gentlemen. The collections were chiefly made from bluffs along tributary streams flowing northward through the Samba Hills into the Rio Yaqui. Our most important collections and sections were made on the Rio Cana near Caimito, the Rio Gurabo near Los Quemados, and the Rio Mao near Cercado.

While proceeding up the Rio Gurabo, Mr. Schmidt and Mr. Olsson observed a sudden change in the fauna of the bluffs near Los Quemados. They felt confident that this indicated a different formation from that further down the stream.

A careful and detailed study of the mollusca we had collected was made by the writer and the presence of two formations verified, the results being published in 1917.[1] I then designated these two formations by index fossil names, calling them the Lower or *Aphera islacolonis formation,* and the Upper or *Sconsia lævigata* formation.[2] This was to contrast them with the *Orthaulax inornatus* formation. I referred the *Orthaulax* formation to the Upper Oligocene of Tampa; the Lower or *Aphera* formation to the Lower Miocene; and the Upper or *Sconsia* formation to the Middle Miocene.

It now, however, seems desirable to apply geographical names, in conformity with modern stratigraphical nomenclature, to these formations. I therefore propose for the Upper or *Sconsia lævigata* formation of my 1917 report, the name Gurabo Formation. This includes primarily our Zones A to F on Rio Gurabo near Los Quemados and our Bluff 1 on Rio Mao near Cercado. For the Lower or *Aphera islacolonis* formation of my 1917 report I now propose the name Cercado Formation. This includes primarily our Bluffs 2 and 3 on Rio Mao near Cercado, our Zones H and I on Rio Cana near Caimito, and our Zone G on Rio Gurabo near Los Quemados. The Cercado formation also includes a set of fossils from Bulla river loaned to me for study by the American Museum of Natural History.

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[1] Bulletins American Paleontology, Nos. 29 and 30.

[2] *Bull. Amer. Pal.*, No. 30, p. 40, and Correlation Table facing p. 44.

SNOW DOUGHNUTS

TO THE EDITOR OF SCIENCE: To the descriptions of snow-rollers which have appeared in recent numbers of your journal may the following be added?

During the winter of 1916–17 a heavy snow fell in Monongalia county, West Virginia, which provided for a short period an opportunity for travel in sleighs. The snow drifted to depths of several feet in places and formed along some roadside fences steep-walled drifts which were, here and there, overhanging at their tops. The writer traveled in a sleigh for several miles along the side of Chestnut Ridge, the westernmost of the Allegheny Mountain ridges in this region. The snow was at this time fresh and unpacked.

At the foot of these steep-walled drifts and also lying part way down their slopes were, in many places, numbers of small snow rings resembling doughnuts in appearance. The rings were a little slenderer than the average

doughnut and the writer's impression is that they were from two to four inches in diameter and about a half inch in thickness. Each had left behind it a track in the snow which led from the foot of the overhanging portion of the drift wall down its side into or nearly to the road. A few curved, columnar pieces of snow were also found which had fallen from the top of the drift and had rolled down the side without forming rings.

It was evident that the rings and columnar pieces had been formed from small tongues of snow which had been built out over the steep side of the drift at its top by the wind. These tongues had separated from the snow wall first at the top and had bowed themselves over until their free ends nearly or quite touched the snow at their bases with the result that they broke away and rolled down the bank.

As in the case of the attainment of large size by the "rolls" described by Karl M. Dallenbach in your issue of October 17, so in this instance the completion of the ring form was a matter of balance during the process of bending forward and rolling down since a few fragments had broken away and rolled on their sides without having attained the ring form.

While the wind seems in this case to have operated in building out the tongues of snow until they became too heavy to maintain their equilibrium it was probably not involved in the rolling process which seems to have been due altogether to gravitational attraction.

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VARIATION OF FISHES ACCORDING TO LATITUDE

To the Editor of Science: In the number of Science for April 4, Professor Starr Jordan discusses the generalization that in certain families of fishes species living in cold waters have a large number of vertebræ, while the related ones of warm waters have a small number. He interprets this as being the result of a general phylogenetic process which is favored either in warm or in cold water, depending upon whether the large or the small number of vertebræ is considered as more primitive. He has attempted to determine which is the more primitive by investigating the ontogeny of the metameres in *Sebastodes,* but has failed in this, because, as seems to be generally the case, the number of metameres characteristic of the adult is attained at a very early stage.

We would refer to the fact that such variations in number of vertebræ with temperature occur within the limits of a single species, as Heincke[1] has shown for *Clupea harengus.* Both sea-herring and coast-herring show a decrease in (1) number of vertebræ, (2) breadth of skull, (3) number of keeled scales, and (4) length of body, as one goes from the open ocean into the Baltic. We would suggest that this shows the adaptation of the large type with many vertebræ to water of great density (very saline and cold) during the critical and sensitive early stages of development, and of the small type with few vertebræ to water of low density (brackish and warm); that is, that certain characteristics connected with a large number of vertebræ make the young of the large type develop successfully in water of high density and that other characteristics connected with a small number of vertebræ make the young of the small type develop successfully in water of low density. The adults are comparatively hardy and able to seek water of suitable density. In the species *Hippoglossoides platessoides,* Collett[2] has shown that northern specimens have more rays in the dorsal and anal fins than have southern specimens. We have not been able to find that the individuals of this species on this side of the Atlantic have the numbers of fin rays varying according to latitude. Nor does the variation of fin rays correspond with the temperature or density of the bottom water in which the adults live. There are however indications that it corresponds with the density of the surface water in which the

1 "The Natural History of the Herring," 17th Ann. Rep. Fishery Board for Scotland, 1899, p. 282.

2 "Fishes," Norweg. North-Atlant. Expedn., Zoology, Vol. III., 1880, p. 148.